

CLAIMS

What is claimed is:

1. A variable capacity rotary compressor, comprising:
 - a housing to define first and second compression chambers having different capacities therein;
 - a rotating shaft to be placed in the first and second compression chambers;
 - first and second eccentric cams mounted to the rotating shaft, to be placed in the first and second compression chambers, respectively;
 - first and second eccentric bushes to rotatably fit over the first and second eccentric cams, respectively;
 - a cylindrical connecting part to integrally connect the first and second eccentric bushes to each other, with a locking slot being provided around the connecting part;
 - a locking pin mounted to the rotating shaft, to project from the rotating shaft, and locked by either of first and second ends of the locking slot, according to a rotating direction of the rotating shaft, making one of the first and second eccentric bushes eccentric from the rotating shaft while making a remaining one of the first and second eccentric bushes be released from eccentricity from the rotating shaft, the first and second eccentric bushes being eccentric in opposite directions; and
 - a restraining unit to fit over the locking pin, to be reciprocated in a radial direction of the rotating shaft, the restraining unit outwardly moving from the rotating shaft by a centrifugal force when the rotating shaft is rotated, and being stopped by either of the first and second ends of the locking slot to restrain the connecting part.
2. The rotary compressor according to claim 1, wherein:
 - the locking pin comprises:
 - a head part to engage with the locking slot; and
 - a locking part to extend from the head part, to be mounted to the rotating shaft, and having a smaller diameter than the head part, and
 - the restraining unit comprises:
 - a support part to fit over the locking part of the locking pin, to be reciprocated in the radial direction of the rotating shaft; and

an extension part to outwardly extend from the support part in the radial direction of the rotating shaft, to cover an outer surface of the head part of the locking pin, and to enter the locking slot.

3. The rotary compressor according to claim 2, wherein:

the extension part extends from upper and lower portions of the support part, to cover upper and lower surfaces of the head part of the locking pin, and

the locking slot has a width to correspond to a width of the head part, with a restraining recess being provided at each of the first and second ends of the locking slot, to have a depth to correspond to a thickness of the extension part, causing the extension part to be stopped within the restraining recess.

4. The rotary compressor according to claim 3, wherein an outer surface of the extension part has a curved surface to correspond to an inner surface of the restraining recess.

5. The rotary compressor according to claim 3, further comprising:

a return spring to fit over the locking part of the locking pin, and to bias the restraining unit toward a central axis of the rotating shaft when the rotating shaft is stopped, releasing the connecting part.

6. The rotary compressor according to claim 3, further comprising:

a magnet included in the rotating shaft, to bias the restraining unit toward a central axis of the rotating shaft when the rotating shaft is stopped, releasing the connecting part.

7. The rotary compressor according to claim 1, further comprising:

a locking hole provided at a predetermined position of the rotating shaft, to movably receive the restraining unit therein.

8. The rotary compressor according to claim 7, further comprising:

a magnet at a position inside the locking hole, to bias the restraining unit toward a central axis of the rotating shaft when the rotating shaft is stopped, releasing the connecting part.

9. The rotary compressor according to claim 1, further comprising:
a return spring included in the rotating shaft, to bias the restraining unit toward a central axis of the rotating shaft when the rotating shaft is stopped, releasing the connecting part.
10. The rotary compressor according to claim 1, further comprising:
an eccentric part having a same shape as the eccentric cams, and provided on an outer surface of the rotating shaft inside the connecting part, to mount the locking pin and the restraining unit to the rotating shaft.
11. The rotary compressor according to claim 5, wherein the return spring is supported at a first end thereof by the head part of the locking pin, and at a second end by the support part of the restraining unit, to allow the restraining unit to be biased toward the central axis of the rotating shaft.
12. The rotary compressor according to claim 11, wherein when the rotating shaft stops rotating and the centrifugal force stops, the extension part of the restraining unit is disengaged from the restraining recess by a restoring force of the return spring, releasing the cylindrical connecting part.
13. The rotary compressor according to claim 8, wherein when the centrifugal force increases by the rotation of the rotating shaft, the restraining unit is pulled away from the magnet and moves outwardly in the radial direction of the rotating shaft, restraining the cylindrical connecting part.
14. A variable capacity rotary compressor, comprising:
a housing to define first and second compression chambers having different capacities therein;
a rotating shaft to be placed in the first and second compression chambers;
first and second eccentric cams mounted to rotating shaft, to be placed in the first and second compression chambers, respectively;
first and second eccentric bushes to rotatably fit over the first and second eccentric cams, respectively, and placed to be eccentric in opposite directions, with a locking slot being provided around each of the first and second eccentric bushes;

first and second locking pins to project from the first and second eccentric cams, respectively, each of the first and second locking pins being locked by either of first and second ends of an associated locking slot of the eccentric bushes, according to a rotating direction of the rotating shaft, making one of the first and second eccentric bushes eccentric from the rotating shaft while making a remaining one of the first and second eccentric bushes be released from eccentricity from the rotating shaft; and

first and second restraining units to fit over the first and second locking pins, respectively, to be reciprocated in a radial direction of the eccentric cams, the first and second restraining units outwardly moving from the first and second eccentric cams, respectively, by a centrifugal force when the eccentric cams are rotated, restraining the first and second eccentric bushes.

15. The rotary compressor according to claim 14, wherein:

each of the first and second locking pins comprises:

a head part to enter the associated locking slot; and

a locking part to extend from the head part, and to be mounted to an associated eccentric cam, and having a smaller diameter than the head part, and

each of the first and second restraining units comprises:

a support part to fit over the locking part of an associated locking pin, and to be reciprocated in the radial direction of the eccentric cams; and

an extension part to outwardly extend from the support part in the radial direction of the eccentric cams, to cover an outer surface of the head part of the locking pin, and to enter an associated locking slot.

16. The rotary compressor according to claim 15, wherein:

the extension part extends from upper and lower portions of the support part, to cover upper and lower surfaces of the head part of the locking pin, and

the locking slot has a width to correspond to a width of the head part, with a restraining recess being provided each of the first and second ends of the locking slot to have a depth to correspond to a thickness of the extension part, causing the extension part to be stopped within the restraining recess.

17. The rotary compressor according to claim 16, further comprising:

a return spring to fit over the locking part of each of the first and second locking pins, and to bias an associated restraining unit toward a central axis of each of the first and second eccentric cams when the first and second eccentric cams are stopped, releasing each of the first and second eccentric bushes.

18. The rotary compressor according to claim 16, further comprising:
a magnet included in each of the first and second eccentric cams, to bias an associated restraining unit toward a central axis of each of the first and second eccentric cams when the rotating shaft is stopped, releasing each of the first and second eccentric bushes.

19. The rotary compressor according to claim 14, further comprising:
a locking hole provided at a predetermined position of each of the first and second eccentric cams, to movably receive each of the first and second restraining units therein.

20. The rotary compressor according to claim 19, further comprising:
a magnet located inside each of the locking holes of the eccentric cams, to bias an associated restraining unit toward a central axis of each of the first and second eccentric cams when the first and second eccentric cams are stopped, releasing each of the first and second eccentric bushes.

21. The rotary compressor according to claim 14, further comprising:
a return spring located at a predetermined position of each of the first and second eccentric cams, to bias an associated restraining unit toward a central axis of each of the first and second eccentric cams when the rotating shaft is stopped, releasing an associated eccentric bush.

22. A variable capacity rotary compressor including a housing to define first and second compression chambers having different capacities therein, the compressor comprising:
a rotating shaft to be placed in the first and second compression chambers; and
a restraining unit outwardly projected from the rotating shaft by a centrifugal force when the rotating shaft is rotated to execute a compression operation, restraining eccentric bushes provided in the compressor to prevent the eccentric bushes from slipping.